

**WE CLAIM**

1    1.    A method of managing storage resources associated with a network having at least  
2    one storage resource coupled to at least one server and at least one client over at least one  
3    data path, wherein said server manages said storage resources over said data path, and  
4    wherein said client directs I/O requests to said storage resources and redirects I/O requests to  
5    said server upon the detection of a failure condition.

1    2.    The method of claim 1 which further includes:  
2         authentication of said client; and  
3         communication of volume information associated with said storage resource to said  
4    client based on the results of said authentication.

1    3.    The method of claim 1 which further includes:  
2         allocation of storage space from said storage resource in response to a client request;  
3    and  
4         communication of volume information associated with said allocated space to said  
5    client.

1    4.    The method of claim 1 which further includes:  
2         allocation of a new storage space from said storage resource in response to a receipt  
3    of a failure condition from a client;  
4         initiation of the recovery of the contents associated with said failure condition in  
5    cooperation with said new storage space; and  
6         communication of a recovery status to said client, wherein said client and said server  
7    continue said recovery based on said recovery status.

1    5.    The method of claim 4 wherein said new storage space includes a new disk  
2    associated with a new physical storage resource.

1    6.    The method of claim 1 which further includes:  
2         changing the volume configuration corresponding to said storage resource;  
3         committing the changes to said changed configuration, during which time said client  
4    is excluded from accessing said storage resource; and

5 communicating the new state of said configuration to said client.

1 7. The method of claim 1 which further includes:

2 providing a copy of unmodified data blocks before modifying said data blocks; and  
3 communicating a list of said modified data blocks to a backup process residing on  
4 said server, wherein said backup process uses a pseudo-device to read said unmodified  
5 blocks and the original contents of the modified data blocks.

1 8. The method of claim 1 which further includes:

2 communication between said clients and said servers over at least a second data path.

1 9. A distributed shared storage resource management system comprising:

2 at least one storage resource coupled to at least one server and at least one client over at least  
3 one data path, wherein said server manages said storage resource over said data path, and  
4 said client directs I/O requests to said storage resource and redirects said I/O requests to said  
5 server upon the detection of a failure condition.

1 10. The system of claim 9 wherein said server is configured to:

2 authenticate each client; and  
3 communicate volume information associated with said storage resource to said client  
4 based on the results of said authentication.

1 11. The system of claim 9 wherein said server is configured to:

2 allocate space from said storage resource in response to a request from a client; and  
3 communicate volume information associated with said allocated space to said client.

1 12. The system of claim 9 wherein said server is configured to:

2 allocate a new storage space from said storage resource in response to a receipt of a  
3 failure condition from a client;  
4 initiate the recovery of the contents associated with said failure condition in  
5 cooperation with said new storage space; and  
6 communicate to said client the recovery status, wherein said client and said server  
7 continue said recovery based on said recovery status.

1       13.     The system of claim 12 wherein said new storage space includes a new disk  
2     associated with new physical storage resource.

1       14.     The system of claim 9 wherein said server is configured to:  
2              change volume configuration associated with said storage resource;  
3              commit the changes to said changed configuration during which time said client is  
4     excluded from accessing said storage resource; and  
5              communicate the new state of said configuration to said client.

1       15.     The system of claim 9 wherein said client is configured to:  
2              provide a copy of unmodified data blocks before modifying said unmodified data  
3     blocks; and

4              communicate a list of said modified data blocks to a backup process residing on said  
5     server, wherein said backup process uses a pseudo-device to read said unmodified and  
6     modified data blocks.

1       16.     The system of claim 9 further includes:  
2              at least a second data path configured to allow communication between said client  
3     and said server.

1       17.     An article comprising a computer-readable medium that stores computer executable  
2     instructions for causing a computer in a distributed shared storage resource management  
3     system which comprises at least one storage resource coupled to at least one server and at  
4     least one client over at least one data path, wherein said computer executable instructions  
5     cause said server to manage said storage resource over said data path, and said client to direct  
6     I/O requests to said storage resource and redirect said I/O requests to said server upon the  
7     detection of a failure condition.

1       18.     The article of claim 17 further includes instructions to:  
2              authenticate each client; and  
3              communicate volume information associated with said storage resource to said client  
4     based on the results of said authentication.

1       19.     The article of claim 17 further comprising instructions to:

2       allocate space from said storage resource in response to a request from a client; and  
3   communicate volume information associated with said allocated space to said client.

1   20.   The article of claim 17 further comprising instructions to:  
2       allocate a new storage space from said storage resource in response to a receipt of a  
3   failure condition from a client;  
4       initiate a recovery of the contents associated with said failure condition in cooperation  
5   with said new storage space; and  
6       communicate a recovery status to said client, wherein said client and said server  
7   continue said recovery based on said recovery status.

1   21.   The article of claim 20 wherein said new storage space includes a new disk associated  
2   with a new physical storage resource.

1   22.   The article of claim 17 further comprising instructions to:  
2       change configuration associated with said storage resource;  
3       commit said changes to said changed configuration during which time said client is  
4   excluded from accessing said storage resource; and  
5       communicate the new state of the changed configuration to said client.

1   23.   The article of claim 17 further comprising instructions to:  
2       provide a copy of unmodified data blocks before modifying said unmodified data  
3   blocks; and  
4       communicate a list of said modified data blocks to a backup process residing on the  
5   server, wherein said backup process uses a pseudo-device to read said unmodified blocks and  
6   the original contents of the modified data blocks.

1   24.   The article of claim 17 further comprising instructions to:  
2       provide at least a second data path to facilitate communication between said client  
3   and said server.

1   25.   A method of managing storage resources associated with a network having at least  
2   one storage resource coupled to at least one server and at least one client over at least one  
3   data path, wherein said server manages said storage resources over said data path, and

- 4 wherein said client directs I/O requests to said storage resources and redirects I/O requests to  
5 said server upon the detection of a failure condition, wherein said method comprising:  
6        changing the volume configuration corresponding to said storage resource;  
7 committing the changes to said changed configuration, during which time said client is  
8 excluded from accessing said storage resource; and  
9        communicating the new state of said configuration to said client.

The term "IP" is defined in the definition section of the specification.